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AUTHOR Riegel, R. Hunt
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ABSTRACT

The responses of young children to two forms of the Sampling Organization and Recall Through Strategies (SORTS) test were compared. Subjects were first, second, and third graders in a Midwestern urban area. Children's SORTS scores, representing the sorting skill levels demonstrated by the children, were derived from a combination of groups formed by the children, their stated reasons for these groups, and experimenter's judgments of their grouping strategies. Scores corresponded to four strategy levels: (1) syncretic strategies, (2) perceptual strategies, (3) low associative strategies, and (4) superordinate and categorical strategies. Results indicate no differences in the scores from two forms of the SORTS test on any of the variables explored. (Author/BJG)

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RELIABILITY OF CHILDREN'S SORTING STRATEGIES USING ALTERNATE FORMS OF THE SORTS TEST

R. Hunt Riegel
University of Minnesota
Research, Development and Demonstration
Center in Education of Handicapped Children
Minneapolis, Minnesota

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TECHNICAL REPORTS

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(Place of publication shown in parentheses where applicable)

1. W. Bart. A Set-theoretic model for the behavioral classification of environments. Occasional Paper #29 July 1974.

2. D. Krus, W. Bart, & P. Airasian. Ordering theory and methods. Occasional Paper #28. July 1974.

3. B. Egeland & A. Thibodeau. Selective attention of impulsive and reflective children. Research Report #66. June 1974.

4. R. Hoffmeister, B. Best, & D. Moores. The acquistion of sign language in deaf children of deaf parents: Progress Report. Research Report #65. June 1974.

5. P. Krus. Use of family history data to predict intellectual and educational functioning longitudinally from ages four to seven. Research Report #64. June 1974.

6. P. Krus. Analyzing for individual differences in evaluating compensatory education programs. Occasional Paper #27. June 1974.

7. J. Randal. The role of speech in the regulation of behavior. Research Report #63. June 1974.

8. N. Buium, J. Rynders, & J. Turnure. A semantic-relational-concepts based theory of language acquisition as applied to Down's Syndrome children: Implication for a language enchancement program. Research Report #62. May 1974.

9. D. Moores, M. Harlow, & S. Fisher. Post secondary programs for the deaf: II. External view. Research Report #61 March 1974.

10. D. Moores, M. Harlow, & S. Fisher. Post secondary programs for the deaf: I. Introduction and overview. Research Report #60. March 1974.

11. D. Krus. Synopsis of basic theory and techniques of order analysis. Occasional Paper #26. April 1974.

12. S. Samuels, J. Spiroff & H. Singer. Effect of pictures and contextual conditions on learning to read. Occasional Paper #25. March 1974.

13. A. Taylor, M. Thurlow & J. Turnure. Elaboration as an instructional technique in the vocabulary development of EMR children. Research Report #59. March 1974.

14. N. Buium & J. Turnure. The universality of self-generated verbal mediators as a means of enhancing memory processes. Research Report #58. January 1974.

15. D. Moores, K. Weiss, & M. Goodwin. Evaluation of programs for hearing impaired children: Report of 1972-73. Research Report #57. December 1973.

16. J. Turnure & W. Charlesworth, D. Moores, J. Rynders, M. Horrobin, S. Samuels, & R. Wozniak. American Psychological Association Symposium Papers. Occasional Paper #24. December 1973.

17. N. Buium. Interrogative types of parental speech to language learning children: a linguistic universal? Research Report #56. December 1973.

18. D. Krus. An outline of the basic concepts of order analysis. Occasional Paper #23. February, 1974.

19. D. Krus. Order analysis: A fortran program for generalizable multidimensional analysis of binary data matrices. Occasional Paper #22. November 1973.

20. W. Bart. The pseudo-problem of IQ. Occasional Paper #21. October 1973.

21. J. Turnure & M. Thurlow. Verbal elaboration and the enhancement of language abilities in the mentally retarded: The role of interrogative sentence-forms. Occasional Paper #20. October 1973.

22. P. Dahl, S. Samuels & T. Archwamety. A master based experimental program for teaching poor readers high speech word recognition skills. Research Report #55. September 1973.

23. R. Riegel, F. Danner & L. Donnelly. Development trends in the generation and utilization of associative relations for recall by EMR and non-retarded children: The SOFTS test. Research Report #54. August 1973.

24. R. Hoffmeister & D. Moores. The acquisition of specific reference in the linguistic system of a deaf child of deaf parents. Research Report #53. August 1973.

25. W. Bart & M. Smith. An interpretive framework of cognitive structures. Occasional Paper #19. June 1973.

26. C. Clark & J. Greco. MELDS (Minnesota Early Language Development Sequence) Glossary of Rebuses and Signs. Occasional Paper #18. June 1973.

27. J. Turnure. Interrelations of orienting response, response latency and stimulus choice in children's learning. Research Report #52. May 1973.

28. S. Samuels & P. Dahl. Automaticity, reading and mental retardation. Occasional Paper #17. May 1973.

29. S. Samuels & P. Dahl. Relationships among IQ, learning ability, and reading achievement. Occasional Paper #16. May 1973.

30. N. Buium & J. Rynders. The early maternal linguistic environment of normal and Down's Syndrome (Mongoloid) language learning children. Research Report #51. May 1973.

31. T. Archwamety & S. Samuels. A mastery based experimental program for teaching mentally retarded children word recognition and reading comprehension skills through use of hypothesis/test procedures. Research Report #50. May 1973.

32. W. Bart. The process of cognitive structure complexification. Research Report #49. April 1973.

33. B. Best. Classificatory development in deaf children: Research on language and cognitive development. Occasional Paper #15. April 1973.

34. R. Riegel, A. Taylor, & F. Danner. The effects of training in the use of grouping strategy on the learning and memory capabilities of young EMR children. Research Report #48. April 1973.

35. J. Turnure & M. Thurlow. The latency of forward and backward association responses in an elaboration task. Research Report #47. March 1973.

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RELIABILITY OF CHILDREN'S SORTING STRATEGIES USING ALTERNATE FORMS OF THE SORTS TEST

R. Hunt Riegel
University of Minnesota
Research, Development and Demonstration
Center in Education of Handicapped Children
Minneapolis, Minnesota

August 1974

The research reported herein was performed pursuant to a grant from the Bureau of Education for the Handicapped, U. S. Office of Education, Department of Health, Education, and Welfare to the Center for Research, Development and Demonstration in Education of Handicapped Children, Department of Special Education, University of Minnesota. Contractors undertaking such projects under government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official position of the Bureau of Education for the Handicapped.

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RESEARCH AND DEVELOPMENT CENTER
IN EDUCATION OF HANDICAPPED CHILDREN
Department of Special Education
Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455

The University of Minnesota Research, Development and Demonstration Center in Education of Handicapped Children has been established to concentrate on intervention strategies and materials which develop and improve language and communication skills in young handicapped children.

The long term objective of the Center is to improve the language and communication abilities of handicapped children by means of identification of linguistically and potentially linguistically handicapped children, development and evaluation of intervention strategies with young handicapped children and dissemination of findings and products of benefit to young handicapped children.

Reliability of Children's Sorting Strategies Using Alternate Forms of the SORTS Test

R. Hunt Riegel

Perhaps the most efficient methods used by children in learning new information consist of either the identification or generation of associative relations between two or more stimuli in their environment. The types of relations typically identified, however, have been found to vary with age in consistent ways. Qualitative differences have been observed by numerous researchers to progress from relatively simple motoric responses such as manipulation of objects for the sake of manipulation, through responses based on perceptual characteristics of objects such as color, size and shape, and ultimately to classifying responses based on functional attributes of objects which must be inferred by the child, such as the use to which they may be put (cf., Riegel, Danner and Donnelly, 1973; Piaget and Inhelder, 1964; Bruner and Olver, 1963).

An instrument designed to assess the types of relations utilized by children between the ages of 5 and 9 has been used extensively by this writer to study the development of, and effects of training on, the utilization of associative relations between pictures of objects in young educable mentally impaired children and in non-impaired children (Riegel, 1972; Riegel, Taylor & Danner, 1973; Riegel, Taylor, Clarren & Danner, 1973; Riegel and Taylor, 1974). In addition, the effects of the relations generated by children on their subsequent recall of those items has been explored, both in terms of the total resultant recall and the organization

of the items recalled (i.e., clustering). This instrument, the Sampling Organization and Recall Through Strategies (SORTS) test (Riegel, 1973) has been used for both pretest and posttest data. Although differences were found between experimental and control groups using the same test items at both pretest and posttest, the need for an alternative form of the instrument is evident. Such an alternative has now been developed and pilot tested. The purpose of the present study is to compare the responses of young children to the two forms of the instrument in order to assess the alternate-form reliability of the measure.

METHOD

Subjects. The subjects for this study were children in a Midwestern urban area. Fourteen children were randomly selected from first, second and third grade regular classrooms.

Procedure. Subjects within grade levels were randomly assigned to one of two conditions. In the first group, children were given Form I of the SORTS Test, followed by Form II. In the second group, this order was reversed. Testing was conducted individually. Each form of the test required approximately 15 minutes to administer.

Instrumentation. Procedures described in the SORTS Manual (Riegel, 1973) were followed for both forms of the test; children were first given a warm-up sorting task in which they were to put a set of 12 pictures

into piles the way they thought best, and their reasons for each pile were recorded. Following this, a test set of 20 items were similarly presented, with the instruction to "put the pictures together in piles so that you can remember them" (Sort 2). After sorting the cards, the children were asked to remember as many of the items as they could, and again their reasons for their groupings were recorded. This constituted the basic procedure for assessing subject-generated grouping responses. A second test procedure using examiner-generated groupings followed the above immediately. The examiner regrouped the same items into conventional categories (described below), and asked the subjects to tell why they thought the pictures were put together in that way (Sort 3). Recall was then requested a second time. This ended the first test administration. After a brief rest period the alternate form (i.e., the second set of test pictures) was administered using the same procedures.

Items selected for inclusion in each test set conformed to the following criteria:

1. They were pictures of common inanimate objects for which the subjects could supply a name.
2. They could be grouped in a variety of meaningful ways including "conventional" categories.
3. Each item was colored either red, yellow, blue, or white such that no two items in the same category were of the same color.

The items, and their category descriptors, although presented in an array in which no two category members were adjacent, are presented on the following page by category for comparison.

Form I

Things that grow

FLOWER
BANANA
LEAF
CORN

Things that make noise

BELL
DRUM
WHISTLE
HORN

Furniture

BED
DESK
TABLE
ROCKING CHAIR

Things to ride in

BOAT
AIRPLANE
BICYCLE
BUS

Things to live in

HOUSE
BARN
TEEPEE
BIRD HOUSE

Form II

Things to wear

SHIRT
SHOES
HAT
DRESS

Things to play with

DOLL
PUZZLE
BALL
BLOCKS

Furniture

TABLE
ARMCHAIR
DESK
BED

Things used for eating

CUP
GLASS
SPOON
KNIFE

Buildings

HOUSE
GARAGE
STORE
CHURCH

Three indices of performance were analyzed for each form of the test, a summary of which follows:

The Sorting level index. This score represents the sorting skill level demonstrated by the child, and is derived from a combination of the groups formed by the child, his stated reasons for those groups, and the experimenter's judgment of the grouping strategy employed. Each group formed is assigned a value according to the specifications in the SORTS coding key (see Administration and Scoring Manual, Riegel, 1973), and yields a score for each child which corresponds to one of the following four levels of grouping:

Level 1: Syncretic strategies. Groups at this level reflect a general failure to generate relations between items on the basis of an attribute or set of attributes. Grouping items by their spatial contiguity ("because they were next to each other") or subordinating the sorting task to an unrelated manipulative operation ("I wanted to make a square with the pictures") are examples of this level. Also included are instances of no strategy for grouping at all, such as the case of a subject simply pulling all items into a single pile or not moving them at all.

Level 2: Perceptual strategies. The groups at this level are based on similarities of color, shape, or size (e.g., "they are all red"). Sorting by perceptual characteristics indicates a basic understanding of grouping by similarities with a lack of attention to more meaningful attributes of the items.

Level 3: Low associative strategies. This level refers to groups which are formed on the basis of meaningful attributes of items. Groups formed by creating a story about the items, those based on similar parts (e.g., "They all have feet"), and those based on chains of associations are examples of level three strategies.

Level 4: Superordinate and categorical strategies. Groupings at this level include superordinate groupings in which all items in a group are subsumed under a single intrinsic attribute or attribute set. Examples of groupings at this level include groups based on items having similar function (e.g., they all are for eating; you can live in them) or on category membership (e.g., they are furniture).

A separate coding key, analogous to the first, but modified to account for the different task requirements, was used to score responses to the examiner-generated groupings (Sort 3).

The Recall Score. The second index is the total number of correctly recalled items in Sorts 2 and 3 obtained by simple counting of verbatim protocols. Repetitions and intrusions are not included in the recall score.

The Clustering Index. Clustering in recall is assumed to be a reflection of covert organizing operations by the subject. The clustering index used with the SORTS test indicates whether or not a subject tends to recall items in the same groups as those which he had earlier generated or seen. The index has been adapted from Frankel and Cole (1971) and consists of a z score which is computed for each subject based on his sorting and recall. Those subjects whose z score exceeds 1.96 are judged to be significantly clustering their recall. Thus, in Sort 2, a z greater than 1.96 indicates that the subject's recall organization corresponds to his sorting organization. In Sort 3, a z greater than 1.96 indicates that the subject's recall organization corresponds to the experimenter's sorting organization.

RESULTS

Comparisons were made on sorting and recall scores between the groups given Form I and Form II on the first administration of the SORTS test, and again on scores from the second administration. Table 1 presents the mean sorting and recall scores for the first administration of Sort 2 for each group within each grade level, and combined across the entire sample. No significant differences were found between the group given Form I and the group given Form II at any of the three grade levels, on either sorting performance or recall in Sort 2 (the subject-generated grouping task). There were also no differences between the mean scores on either variable when combined across grade levels.

Insert Table 1 about here

When presented with examiner-grouped categories, many of the children were able to identify associative relations between the items, but again no differences were found between scores on the two forms of the test for groups at all three grade levels, as well as between scores for the combined groups. Table 2 presents these data.

Insert Table 2 about here

Similarly, the two forms of the SORTS test yielded comparable results when subjects were asked to identify relations and recall items from the examiner grouped items. No differences were found between the scores from the two forms in either identification or recall in Sort 3. Table 4 summarizes the findings from this task.

Insert Table 4 about here

Comparisons of scores between the two forms of the test, regardless of order of presentation, showed no differences between the two forms. Mean scores for each variable are presented in Table 5.

Insert Table 5 about here

There were no differences in the proportion of children clustering their recall on the two forms of the test. While 44% of the children clustered during recall from their own groupings (i.e., in Sort 2) on Form I, 39% clustered on Form II. In recall of the examiner's groupings (Sort 3), 73% clustered on Form I while 87% clustered on Form II.

In addition to the above comparisons, correlational analyses were run on each child's scores from the two forms of the test. The rank-order coefficient for sorting level scores on Sort 2 was .53 ($p < .01$), while that of Sort 3 was .90 ($p < .001$). Pearson coefficients for recall on the two forms were .55 ($p < .01$) for Sort 2, and .64 ($p < .01$) for Sort 3.

DISCUSSION

The results of this study showed no differences in the scores from two forms of the SORTS test on any of the variables explored. It is apparent that the two sets of pictures do not inherently elicit significantly different grouping or mnemonic strategies in young children. Given the constraints

on the stimulus items (i.e., pictures of concrete, familiar objects; color; size; categories represented), children tend to persevere in the manner in which they approach the task of organizing and remembering information. These results lead us to the conclusion that the two forms of the SORTS test do indeed yield comparable results, and may be used in future inquiry as alternate forms.

In addition to this conclusion, evidence may be found in support of previous conclusions that sorting, recall and clustering performance increase consistently with age (Riegel, Danner and Donnelly, 1973). While no differences were found between scores on Form I of the SORTS test and scores on Form II within any of the three grade levels tested, consistent trends toward higher levels of sorting, higher recall, and more children clustering were observed as grade level increased. It appears that the two forms of the SORTS test are consistent both in yielding similar results within age levels, and in reflecting similar developmental changes in sorting and mnemonic performance.

REFERENCES

Bruner, J. and Olver, R. Development of equivalence transformations in children. Monograph for the Society for Research in Child Development, 1963, 22, 125-141.

Frankel, F. and Cole, M. Measures of organization in free recall. Psychological Bulletin, 1971, 76, 39-44.

Piaget, J. and Inhelder, B. The Early Growth of Logic in the Child: Classification and Seriation. London: Routledge and Kegan Paul, 1964.

Riegel, R. H. Measuring educationally handicapped children's organizational strategies by sampling overt groupings. Research Report #37, Research, Development and Demonstration Center in Education of Handicapped Children, University of Minnesota, 1972.

Riegel, R. H. Sampling Organization and Recall Through Strategies: Administration and scoring manual, Research, Development and Demonstration Center in Education of Handicapped Children, University of Minnesota, 1973.

Riegel, R. H., Danner, F., and Donnelly, L. Developmental trends in the generation and utilization of associative relations for recall by EMR and non-retarded children: the SORTS test. Research Report #54, Research, Development and Demonstration Center in Education of Handicapped Children, University of Minnesota, 1973.

Riegel, R. H. and Taylor, A. M. A comparison of conceptual strategies for grouping and remembering employed by educable mentally retarded and non-retarded children. American Journal of Mental Deficiency, 1974, 78, 592-598.

Riegel, R. H., Taylor, A., Clarren, S. & Danner, F. Training educationally handicapped children to use associative grouping strategies for the organization and recall of categorizable material. Research Report #42, Research, Development and Demonstration Center in Education of Handicapped Children, University of Minnesota, 1972.

Riegel, R. H., Taylor, A. and Danner, F. The effects of training in the use of a grouping strategy on the learning and memory capabilities of young EMR children. Research Report #48, Research, Development and Demonstration Center in Education of Handicapped Children, University of Minnesota, 1973.

Table 1. Mean sorting and recall scores for Sort 2 (Self-generated groupings): First administration

	Sorting Scores		Recall	
	Form I	Form II	Form I	Form II
Gr. 1	2.01	1.47	6.57	4.86
(s.d.)	(0.71)	(0.60)	(2.15)	(2.04)
Gr. 2	2.14	2.26	6.86	8.57
(s.d.)	(1.35)	(1.04)	(2.34)	(2.82)
Gr. 3	2.33	2.55	9.0	10.86
(s.d.)	(0,83)	(1.22)	(2.83)	(2.27)
Combined	2.16	2.09	7.48	8.10
(s.d.)	(0.96)	(1.05)	(2.58)	(3.40)

Table 2. Mean sorting and recall scores for Sort 3 (examiner-generated groupings): First administration

	Sorting Scores		Recall	
	Form I	Form II	Form I	Form II
Gr. 1.	2.71	2.97	8.86	10.00
(s.d.)	(1.45)	(0.71)	(2.97)	(3.37)
Gr. 2.	2.94	3.43	8.57	10.43
(s.d.)	(1.26)	(0.77)	(2.57)	(2.51)
Gr. 3.	3.86	3.66	11.00	11.29
(s.d.)	(0.30)	(0.57)	(3.06)	(2.43)
Combined	3.17	3.35	9.48	10.57
(s.d.)	(1.18)	(0.72)	(2.94)	(2.99)

Table 3. Mean sorting and recall scores for Sort 2 (self-generated groupings): Second administration

	Sorting Scores		Recall	
	Form I	Form II	Form I	Form II
Gr. 1	2.37	1.99	6.57	7.57
(s.d.)	(0.87)	(0.80)	(1.98)	(2.99)
Gr. 2	2.42	2.61	8.00	6.86
(s.d.)	(0.90)	(1.13)	(2.38)	(2.04)
Gr. 3	3.51	2.95	9.86	10.43
(s.d.)	(1.11)	(1.19)	(2.48)	(4.39)
Combined	2.76	2.51	8.14	8.29
(s.d.)	(1.06)	(1.08)	(2.89)	(3.49)

Table 4. Mean sorting and recall scores for Sort 3 (examiner-generated groupings): Second administration

	Sorting Scores		Recall	
	Form I	Form II	Form I	Form II
Gr. 1	3.06	2.69	7.86	7.43
(s.d.)	(0.99)	(1.22)	(2.73)	(3.91)
Gr. 2	3.51	3.03	12.29	11.29
(s.d.)	(0.72)	(1.15)	(2.29)	(1.89)
Gr. 3	3.80	3.93	12.28	10.71
(s.d.)	(0.38)	(0.19)	(2.69)	(3.09)
Combined	3.46	3.21	10.81	9.81
(s.d.)	(0.77)	(1.07)	(3.25)	(3.40)

Table 5. Mean sorting level and recall scores for Form I and Form II independent of order of presentation (N=42)

	Sorting Scores		Recall	
	Form I	Form II	Form I	Form II
Sort 2 $\bar{X}$	2.45	2.31	7.81	8.00
(s.d.)	(1.04)	(1.09)	(2.73)	(3.30)
Sort 3 $\bar{X}$	3.29	3.29	10.14	10.69
(s.d.)	(1.04)	(0.94)	(3.14)	(3.29)

36. R. Riegel & A. Taylor. Strategies in the classroom: A summer remedial program for young handicapped children. Occasional Paper #14. March 1973.

37. D. Moores. Early childhood special education for the hearing impaired. Occasional Paper #13. February 1973.

38. R. Riegel & A. Taylor. A comparison of conceptual strategies for grouping and remembering employed by educable mentally retarded and non-retarded children. Research Report #46. February 1973.

39. J. Rynders. Two basic considerations in utilizing mothers as tutors of their very young retarded or potentially retarded children. Occasional Paper #12. January 1973.

40. R. Bruininks, J. Rynders & J. Gross. Social acceptance of mildly retarded pupils in resource rooms and regular classes. Research Report #45. January 1973.

41. J. Turnure & M. Thurlow. The effects of interrogative elaborations on the learning of normal and EMR children. Research Report #44. January 1973. (Proceedings of the International Association for the Scientific Study of Mental Deficiency, in press.)

42. J. Turnure & S. Samuels. Attention and reading achievement in first grade boys and girls. Research Report #43. November 1972. (Journal of Educational Psychology, in press.)

43. R. Riegel, A. Taylor, S. Clarren, & F. Danner. Training educationally handicapped children to use associative grouping strategies for the organization and recall of categorizable materials. Research Report #42. November 1972.

44. R. Riegel, F. Danner, & A. Taylor. Steps in sequence: Training educationally handicapped children to use strategies for learning. Development Report #2. November 1972.

45. A. Taylor, M. Thurlow, & J. Turnure. The teacher's introduction to: The math vocabulary program. Development Report #1. March 1973.

46 J. Turnure & M. Thurlow. The effects of structural variations in elaboration on learning by normal and EMR children. Research Report #41 September 1972.

47. A. Taylor & N. Bender. Variations of strategy training and the recognition memory of EMR children. Research Report #40. September 1972. (American Educational Research Journal, in press.)

48. D. Moores, C. McIntyre, & K. Weiss. Evaluation of programs for hearing impaired children: Report of 1971-72. Research Report #39. September 1972.

49. R. Rubin. Follow-up of applicants for admission to graduate programs in special education. Occasional Paper #11. July 1972.

50. D. Moores. Communication— Some unanswered questions and some unquestioned answers. Occasional Paper #10. July 1972.

51. A. Taylor & S. Whitely. Overt verbalization and the continued production of effective elaborations by EMR children. Research Report #38. June 1972. (American Journal of Mental Deficiency, in press.)

52. R. Riegel. Measuring educationally handicapped children's organizational strategies by sampling overt groupings. Research Report #37. May 1972.

53. E. Gallistel, M. Boyle, L. Curran, & M. Hawthorne. The relation of visual and auditory aptitudes to first grade low readers' achievement under sight-word and systematic phonic instruction. Research Report #36. May 1972.

54. E. Gallistel & P. Fischer. Decoding skills acquired by low readers taught in regular classrooms using clinical techniques. Research Report #35. May 1972.

55. J. Turnure & M. Thurlow. Verbal elaboration in children: Variations in procedures and design. Research Report #34. March 1972.

56. D. Krus & W. Bart. An ordering-theoretic method of multidimensional scaling of items. Research Report #33. March 1972.

57. J. Turnure & S. Larsen. Effects of various instruction and reinforcement conditions on the learning of a three-position oddity problem by nursery school children. Research Report #32. March 1972.

58. J. Turnure & S. Larsen. Outerdirectedness in mentally retarded children as a function of sex of experimenter and sex of subject. Research Report #31. March 1972.

59. J. Rynders & J. Horrobin. A mobile unit for delivering educational services to Down's Syndrome (Mongoloid) infants. Research Report #30. January 1972. (Presented at Council for Exceptional Children, Special National Conference, Memphis, December, 1971.)

60. F. Danner & A. Taylor. Pictures and relational imagery training in children's learning. Research Report #29. December 1971. (Journal of Experimental Child Psychology, in press.)

61 J. Turnure & M. Thurlow. Verbal elaboration phenomena in nursery school children. Research Report #28. December 1971. (Study II: Proceedings of 81st Annual Convention of the American Psychological Association, in press.)

62. D. Moores & C. McIntyre. Evaluation of programs for hearing impaired children: Progress report 1970-71. Research Report #27. December 1971.

63. S. Samuels. Success and failure in learning to read: A critique of the research. Occasional Paper #9. November 1971. (In M. Kling, The Literature of Research in Reading with Emphasis on Modes, Rutgers University, 1971.)

64. S. Samuels. Attention and visual memory in reading acquisition. Research Report #26. November 1971.

65. J. Turnure & M. Thurlow. Verbal elaboration and the promotion of transfer of training in educable mentally retarded children. Research Report #25. November 1971. (Journal of Experimental Child Psychology, 1973, 15, 137-148.)

66. A. Taylor, M. Josberger, & S. Whitely. Elaboration training and verbalization as factors facilitating retarded children's recall. Research Report #24. October 1971. (Journal of Educational Psychology, in press.)

67. W. Bart & D. Krus. An ordering-theoretic method to determine hierarchies among items. Research Report #23. September 1971.

68. A. Taylor, M. Josberger, & J. Knowlton. Mental elaboration and learning in retarded children. Research Report #22. September 1971. (Mental Elaboration and Learning in EMR children. American Journal of Mental Deficiency, 1972, 77, 69-76.)

69. J. Turnure & S. Larsen. Outerdirectedness in educable mentally retarded boys and girls. Research Report #21. September 1971. (American Journal of Mental Deficiency, in press.)

70. R. Bruininks, T. Glennan, & C. Clark. Prevalency of learning disabilities: Findings, issues, and recommendations. Research Report #20. June 1971. (Presented at Council for Exceptional Children Convention, Miami Beach, April, 1971.)

71. M. Thurlow & J. Turnure. Mental elaboration and the extension of mediational research: List length of verbal phenomena in the mentally retarded. Research Report #19. June 1971. (Journal of Experimental Child Psychology, 1972, 14, 184-195.)

72. G. Siegel. Three approaches to speech retardation. Occasional Paper #8. May 1971.

73. D. Moores. An investigation of the psycholinguistic functioning of deaf adolescents. Research Report #18. May 1971. (Exceptional Children, May 1970, 36, 645-652.)

74. D. Moores. Recent research on manual communication. Occasional Paper #7. April 1971. (Keynote Address, Division of Communication Disorders, Council for Exceptional Children Annual Convention, Miami Beach, April 1971.)

75. J. Turnure, S. Larsen, & M. Thurlow. Two studies on verbal elaboration in special populations. I. The effects of brain injury; II. Evidence of transfer of training. Research Report #17. April 1971. (Study I: American Journal of Mental Deficiency, in press.)

76. R. Bruininks & J. Rynders. Alternatives to special class placement for educable mentally retarded children. Occasional Paper #6. March 1971. (Focus on Exceptional Children, 1971, 3, 1-12.)

77. D. Moores. Neo-oralism and the education of the deaf in the Soviet Union. Occasional Paper #5. February 1971. (Exceptional Children, January 1972, 39, 377-384.)

78. D. Feldman, B. Harrinan, & S. Hartfeldt. Unusualness, appropriateness, transformation and condensation as criteria for creativity. Research Report #16. February 1971. (American Educational Research Association Annual Conference, New York, February 1971.)

79. F. Broen & G. Siegel. Variations in normal speech disfluencies. Research Report #15. January 1971. (Language & Speech, in press.)

80. D. Feldman. Map understanding as a possible crystallizer of cognitive structures. Occasional Paper #4. January 1971. (American Educational Research Journal, 1971, 3, 484-502.)

81. J. Rynders. Industrial arts for elementary mentally retarded children: An attempt to redefine and clarify goals. Occasional Paper #3. January 1971.

82. D. Moores. Education of the deaf in the United States. Occasional Paper #2. November 1970. (Moscow Institute of Defectology, 1971, published in Russian.)

83. R. Bruininks & C. Clark. Auditory and learning in first-, third-, and fifth-grade children. Research Report #14. November 1970.

84. R. Bruininks & C. Clark. Auditory and visual learning in first grade educable mentally retarded normal children. Research Report #13. November 1970. (American Journal of Mental Deficiency, 1972, 76, No. 3, 561-567.)

85. R. Bruininks. Teaching word recognition to disadvantaged boys with variations in auditory and visual perceptual abilties. Research Report #12. November 1970. (Journal of Learning Disabilities, 1970, 3, 30-39.)

86. R. Bruininks & W. Lucker. Change and stability in correlations between intelligence and reading test scores among disadvantaged children. Research Report #11. October 1970. (Journal of Reading Behavior, 1970, 2, 295-305.)

87. R. Rubin. Sex differences in effects of kindergarten attendance on development of school readiness and language skills. Research Report #10. October 1970. (Elementary School Journal, 72, No. 5, February 1972.)

88. R. Rubin & B. Balow. Prevalence of school learning & behavior disorders in a longitudinal study population. Research Report #9. October 1970. (Exceptional Children, 1971, 38, 293-299.)

89. D. Feldman & J. Bratton. On the relativity of giftedness: An empirical study. Research Report #8. August 1970. (American Educational Research Annual Conference, New York, February 1971.)

90. J. Turnure, M. Thurlow, & S. Larsen. Syntactic elaboration in the learning & reversal of paired-associates by young children. Research Report #7. January 1971.

91. R. Martin & L. Berndt. The effects of time-out on stuttering in a 12-year-old boy. Research Report #6. July 1970. (Exceptional Children, 1970, 37, 303-304.)

92. J. Turnure & M. Walsh. The effects of varied levels of verbal mediation on the learning and reversal of paired associates by educable mentally retarded children. Research Report #5. June 1970. (Study I: American Journal of Mental Deficiency, 1971, 76, 60-67. Study II: American Journal of Mental Deficiency, 1971, 76, 306-312.)

93. J. Turnure, J. Rynders, & W. Jones. Effectiveness of manual guidance, modeling & trial & error learning for inducing instrumental behavior in institutionalized retardates. Research Report #4. June 1970. (Merrill-Palmer Quarterly, 1973, 19, 49-65.)

94. J. Turnure. Reactions to physical and social distractors by moderately retarded institutionalized children. Research Report #3. June 1970. (Journal of Special Education, 1970, 4, 283-294

95. D. Moores. Evaluation of preschool programs: An interaction analysis model. Occasional Paper #1. April 1970. (Keynote Address, Diagnostic Pedagogy, International Congress on Deafness. Stockholm, August 1970; also presented at American Instructors of the Deaf Annual Convention, St. Augustine, Florida, April, 1970.)

96. D. Feldman & W. Markwalder. Systematic scoring of ranked distractors for the assessment of Piagetian reasoning levels. Research Report #2. March 1970. (Educational and Psychological Measurement, 1971, 31, 347-362.)

97. D. Feldman. The fixed-sequence hypothesis: Individual differences in the development of school related spatial reasoning. Research Report #1. March 1970.

98. D. Feldman & W. Markwalder. Systematic scoring of ranked distractors for the assessment of Piagetian reasoning levels. Research Report #2. March 1970. (Educational and Psychological Measurement, 1971, 31, 347-362.)

99. D. Feldman. The fixed-sequence hypothesis: Individual differences in the development of school related spatial reasoning. Research Report #1. March 1970.